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Summary Statement on Pesticides and Mercury in Alberta. February 3, 1970 1
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SUMMARY STATEMENT
ON PESTICIDES AND MERCURY
IN ALBERTA

A Report Prepared By

Staff of the Departments

of Agriculture, Health, and

Lands and Forests

Government of Alberta

February 3, 1970

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STATEMENT ON PESTICIDES IN ALBERTA

For many years the Government of Alberta has been testing and recommending the use of safer, less persistent pesticides, and will continue to do so.

Highly toxic arsenic and fluosilicate poisons were used for grasshopper control since the early days of settlement. These were replaced in 1949 with baits containing chlordane. Over the next few years as new materials were proven, chlordane, aldrin and dieldrin insecticides came into use as crop sprays. These gave economical, easy-to-apply, effective control of grasshoppers but new knowledge soon revealed the problem of persistent residues, especially in pasture and feed crops and animal food products. Investigations and testing continued to develop and replace the effective but persistent organochlorine insecticides with shorter lasting organophosphates such as malathion and dimethoate, used today.

Such persistent organochlorines as DDT are now found in the environment throughout the world. Although the low levels of DDT found in Alberta are not considered significant to human health, they are of concern to wildlife authorities because of concentration in predatory birds and fish. The newer insecticides are less persistent but most are more toxic than DDT to people. The age of chemicals and pesticides produces new advances and new difficulties.

1) MERCURY RESIDUES IN WILDLIFE

In the fall of 1969 a new problem was brought to the attention of the government. On September 8 the Canadian Wildlife Service presented a report on mercury residues in pheasants and Hungarian partridge. This was brought to the attention of the Alberta Interdepartmental Committee on Pesticides (A.I.C.P.) which called a special meeting September 12 to consider the problem.

Canadian Wildlife Service survey results from 1968 and 1969 showed mercury levels above the accepted tolerance of 0.1 parts per million (p.p.m.) in some birds and mammals including pheasants and H. partridge. The samples in both years had been collected in early summer and showed levels varying from 0.238 to 0.794 p.p.m. mercury. The significance of this information posed some problem to the A.I.C.P. in that:

1) the sample was smaller than desirable i.e. in 1969, nine laboratory analyses on pooled muscle samples of 14 pheasants and 12 H. partridge, and in 1968, eleven laboratory analyses on liver samples of 8 pheasants and 3 H. partridge,
2) all of the samples were collected in southern Alberta and the situation for the rest of the province was unknown,

3) there was no knowledge of mercury levels in the fall, some three months after sampling. Investigations carried out on contaminated chickens in 1967 showed that the half life of mercury in pullets and hens was 12 and 18 days. Game birds might respond likewise or vary considerably.

Thus in view of the potential hazard to human health the A.I.C.P. recommended that the hunting season for pheasants and Hungarian partridge should be closed for 1969. A Working Subcommittee of the A.I.C.P. was established to head and coordinate investigation on many aspects of the situation. It agreed upon and organized the following general plan for further research:

1) Immediate sampling by Fish and Wildlife Officers of pheasants and H. partridge across the province with emphasis on southern Alberta to duplicate the June - July survey area.
2) To analyze samples as rapidly as possible by the Provincial Analyst of Alberta Agriculture, using standard methods, with cross-checks by the Plant Products Laboratory of Canada Agriculture, Calgary. Some split samples to be analyzed by Alberta Fish and Wildlife using the newer neutron activation method at the University of Toronto and Gulf General Atomic, California.
3) Feeding trials to be set up using hatchery pheasants fed on mercury treated seed to develop information on levels of contamination reached and excretion rates.
4) Investigation of areas where high mercury levels were found to determine sources of contamination.

On September 18 the hunting season was postponed to November 1 by the Minister of Lands and Forests since it was apparent that sampling and analyses could not provide sufficient new information by the time the season was due to open on October 10. On October 28 the hunting season was cancelled because no new data was available to alter the original decision.

At the second special meeting of A.I.C.P. October 9 reports showed that some 346 game birds had been collected, of which 56 pheasants and H. partridge had been analyzed by the Provincial Analyst. Analysis results varied considerably from Nil to 0.8 p.p.m. mercury. Results from other laboratories were not available and further decision was deferred.

At the third special meeting of A.I.C.P. October 16 all available data was reviewed and discussed with Dr. R. E. Jervis of the University of Toronto, who had considerable experience with mercury. It was reported that mercury investigation was a complex operation due to naturally occurring levels, the question of sensitivity of analytical methods, and the reliability of results. The newer neutron

activation method was considered the best, especially at levels below 0.1 p.p.m. but laboratory procedure and experience were quite important for reliable results.

A total of 85 birds had been analyzed by the Provincial Analyst consisting of 56 pheasants and 29 H. partridge. Of the 38 recent analyses, 4 were over the actionable level ranging from 0.1 to 0.365 p.p.m. mercury. It was apparent that levels had dropped off and a resolution was moved to permit hunting with information on the situation and risks supplied to the public. The motion was tabled until the next meeting when analyses results from outside laboratories would be available.

At the next regular meeting of the A.I.C.P. December 17, analyses data from all laboratories was reviewed. For the neutron activation method, one laboratory showed 3 out of 43 fall collected birds above 0.1 p.p.m. mercury. Another laboratory using the same method showed only one bird out of 24 exceeded 0.1 p.p.m. mercury. Data from a third laboratory was excluded since it reported that the method used was not reliable below 0.2 p.p.m.

There was considerable difference in results from the three laboratories until experience was developed, as indicated below:

COMPARISON OF MERCURY ANALYSES IN P.P.M. (wet weight)
BY VARIOUS LABORATORIES (SEPTEMBER, 1969 SAMPLES)

SAMPLE NO.	CAL. GULF ATOMIC	UNIV. TORONTO	PROV. ANALYST
1	0.006	0.050	NIL
9	0.035	0.020	NIL
15	0.812	0.050	NIL
20	0.033	0.026	NIL
21	0.012	0.028	NIL
23	0.029	0.034	NIL
24	0.015	0.052	0.04
25	0.017	0.013	0.25
27	0.014	0.031	0.02
42	0.027	0.028	NIL
43	0.106	0.037	0.36
48	0.014	0.021	0.17
89	0.007	0.025	NIL

RANGE WET WT. MERCURY P.P.M.			
0.000-0.049	11	10	10
0.050-0.099	0	3	0
0.100-0.499	1	0	3
0.500-0.999	1	0	0
	13	13	13

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The complexity of interpreting results becomes apparent when it is noted that the three laboratories reported 2, Nil and 3 birds out of the same 13 birds as being above the actionable level of 0.1 p.p.m. mercury. The results of about 130 analyses of the 382 birds collected in September show a general decline in mercury levels compared to June - July samples but some still are above accepted tolerance. For the actionable cases, only two are confirmed by another laboratory.

A further difficulty in mercury determination is the limitation of laboratory equipment and staff. Present provincial facilities permit about 10 analyses in duplicate per week. Duplication is essential for reliable results. Costs are estimated in excess of $50.00 for each analyses. Total cost of the mercury investigation to date is well over $60,000.00.

Spillage of treated grain during handling, treating, transporting and planting is probably a major source of mercury contamination. Preliminary investigations of higher levels of mercury showed that these birds came from areas where old stocks of mercury treated seed had been dumped. A campaign is underway to inform growers on safe seed handling and disposal procedures. The 1969 Agricultural Chemicals Act and proposed regulations will provide the necessary legislation to enforce safe practices.

Seed treatment is considered necessary to control a wide range of cereal diseases. Non-mercurial treatments are available but are all powder formulations which pose a dust hazard to the applicator, handler and farmer. All 68 municipal co-op seed cleaning plants, which treat up to 50% of the cereal seed used, have liquid treaters. Liquid formulations of non-mercurials are being developed. In 1969 the Alberta Department of Agriculture found that in field tests at two locations at least five out of 31 non-mercurial liquids tested were promising replacements for the mercurials. These are likely to be commercially available within two years.

In the meantime all mercury seed treatment compounds and labels are being reviewed by the Canada Department of Agriculture in Ottawa with further restrictions expected. Plans are underway to incorporate a fluorescent marker into the red dye used in seed treatment compounds since 1968. This will assist in detecting trace amounts in commercial grain and feed. The Canada Committee on Pesticide Use in Agriculture is completing a report for action in the proper use and disposal of treated seed.

It is intended to phase out mercury seed treatments and possibly other mercury uses as replacement compounds become available over the next few years.

Investigations presently underway in Canada and elsewhere should provide important, new information on mercury levels occurring in nature and levels in other organisms such as fish which in some Canadian waters are now known to carry between 0.5 to 11 p.p.m. mercury. There is little information on mercury levels in human food or in humans themselves.

The tolerance for mercury proposed by FAO-WHO is 0.05 p.p.m. but in Canada the desirable "administrative tolerance" or "actionable level" in food products as used by the Food and Drug Directorate is 0.1 p.p.m. This should not be confused with the "acceptable daily intake" which is defined as the daily dosage of a chemical that could be taken during an entire lifetime without appreciable risk. The tolerance is always lower than the acceptable daily intake, usually by a safety factor of up to 100 times. Since mercury residues have not been investigated to any large extent, the significance of relatively low levels for man and other species requires considerable further study and research.

Investigations will be continued during 1970. Feeding trials will provide new information on the rates of accumulation and excretion of mercury in game birds. Monitoring of game birds and other wildlife is planned for mercury and other pesticides, as well as for agricultural foods. Further investigation of the effects of mercury on birds of prey will be conducted since present evidence indicates that some species may be seriously affected. The Alberta Research Council plans to check for mercury in ground water. The various disciplines in Agriculture, Health, and Fish and Wildlife will continue the team-approach in investigating and resolving problems. However complex situations such as mercury and others that can be expected in the future will require further specialized staff and facilities to resolve these problems.

2) DDT AND OTHER PERSISTENT PESTICIDES

DDT came into use during World War 2 in the treatment of military troops and civilians for the control of human lice that transmitted typhus. During January, 1944, 1.3 million people in Naples, Italy were treated with DDT and the typhus epidemic was rapidly controlled - for the first time in history during winter months. After the war, DDT rapidly came into widespread use for the control of insect-borne diseases and food crop pests. In 1948, Dr. Paul Muller received the Nobel Prize in Medicine and Physiology for his discovery of DDT.

The world has been doused with DDT for 25 years. It has been used to successfully control the age-old scourges of malaria, yellow fever, typhus and other diseases plus crop destroying and nuisance insect pests. However it was found in the 1950's that DDT, and later sister developments of chlordane, aldrin, dieldrin, heptachlor and endrin, were highly persistent and stored in the body fat of organisms and humans. The extent of environmental contamination by DDT and the other organochlorine (chlorinated hydrocarbon) insecticides became increasingly clear within the last decade as the result of the continuing refinement of analytical methods which permit the detection of trace amounts in parts per billion and even trillion.

There is no evidence that present levels of DDT in the Canadian diet have caused injury to humans. Surveys on human tissues show that DDT levels in the U.S. and Canada are remaining constant or dropping. However there is mounting evidence of deleterious effects on wildlife organisms. In general terms, insecticides are more toxic to insects and other invertebrates than to vertebrates and, among vertebrates, fish are more sensitive than birds which are more sensitive than mammals. Organochlorines build up through the food chain and are concentrated in those fish, birds and animals that prey on others.

Action has been taken in many parts of the world to severely restrict and even ban the use of DDT and other compounds. In Sweden aldrin and dieldrin have been banned and a two year moratorium declared on DDT. In the U.S., Arizona has banned the sale of DDT for one year and other states are restricting its use. In Canada, Ontario has limited DDT to only several uses under permit, and has banned the use of aldrin, dieldrin and heptachlor except for termite control or matters of public interest.

National governments have taken a less restrictive approach. The U.S. has announced the removal of DDT from federal spray programs and the phasing out of DDT over a two year period. The Canadian government has discontinued the use of DDT by federal agencies such as forestry, national parks and the armed forces. The DDT label has been restricted to allow 1970 use on only 12 food crops as compared to 62 in 1969. In 1970 DDT cannot be used for mosquito and biting fly control in large area programs except under emergency situations after careful consultation between federal and provincial interdepartmental committees. DDT has also been taken out of small pack formulations so that in effect its use will be discontinued in homes and backlot gardens (Appendix Pages 16-20).

The Alberta government's position on DDT use and restrictions will generally follow very closely the federal government's policy, (Appendix Page 21). For a

number of years, the use of less persistent insecticides has been recommended and promoted, and this will be continued, as practical, safe replacement compounds or other protective measures become available. Over the years in Alberta DDT has been replaced with shorter lasting insecticides. For 1970 the only likely uses will be in backrubbers on southern ranches to control persistent hornflies and other biting flies on range beef cattle and for control of flea beetles on young seedlings of rape and mustard crops. In both cases, small amounts are involved, no practical problems are foreseen for wildlife, and research is planned to develop safer alternatives.

The major use of DDT in Alberta has been in mosquito control programs in urban areas and in northern development areas. DDT was not recommended in 1969 and organophosphate insecticides were field tested. Several shorter lasting, effective but more expensive insecticides are recommended for 1970, namely malathion, abate and dursban. Further research and field testing is underway by Alberta and Canada departments of agriculture and the University of Alberta.

Under Provincial Board of Health regulations any application of pesticides to or close to water can only be carried out under permit approved by the Board. This provides for prior clearance of programs such as the use of herbicides to control aquatic plants or the use of mosquito larvicides for treating wet areas. With the discontinuation of DDT for mosquito control, home and garden use, etc. the present limited use of DDT in Alberta will be further reduced by over ninety five percent.

Along with restricted use patterns, the federal government through the Food and Drug Directorate has reduced the tolerance for DDT from 7 p.p.m. to 1 p.p.m. for 61 common vegetables and fruits; to 3.5 p.p.m. on citrus fruits, apples, pears and celery. The only unchanged tolerance at 7 p.p.m. is for the fat of cattle, hogs and sheep. These tolerances will be kept under review and reduced or eliminated as practical replacement compounds become available. There is no tolerance for DDT in potatoes and no tolerances for any pesticide residues in eggs, fish, milk, cream, butter and other dairy products. The Food and Drug Directorate sample and analyze foods for pesticides and other contaminants across Canada. In Alberta 50 to 100 food samples are monitored each year, including whole restaurant meals which require a variety of food components. The Alberta Department of Agriculture monitors a further 1500 to 2000 samples each year, consisting mainly of food samples but also feeds, soil, water, human tissues, fish and wildlife.

Various agencies from health, fish and wildlife, and agriculture cooperate in the monitoring program. Problem cases are defined, followed up to determine source and amount of contamination, and action taken to keep produce out of consumption by humans or animals until safe levels are reached, and the source of contamination eliminated. There is a co-ordinated control program operated with federal agencies such as the Food and Drug Directorate, the Plant Products Division of Canada Agriculture and Canadian Wildlife Service, plus the liaison of provincial agencies in health, fish and wildlife and agriculture.

Coordination and liaison is assured through the action of the Food Residue Committee of the department of agriculture and others such as the Alberta Interdepartmental Committee on Pesticides which was established in 1965 with representatives from federal and provincial agencies in agriculture, health, and fish and wildlife services.

Although monitoring is only part of the pesticide management program it serves a very useful function in locating problems, providing an over-all view of the provincial situation, and trends or changes over the years. The table on Page 7 of the Appendix shows Number of Samples Tested for Pesticide Residues from 1961 to 1969. Close to 8000 samples have been monitored in the nine year period. Pages 8 to 11 of the Appendix show that Poisoning By Pesticides constitutes 3 to 5% of the Poisonings By Substances Other Than Pesticides from 1964 to 1969.

The following is a summary of DDT residues and its metabolites in agricultural commodities and human tissues analyzed during the interval from January 1, 1966 to September 30, 1969 (number of samples analyzed with percentages in brackets):

TOTAL	RESIDUE LEVEL		
	No detectable	Less than 0.1 p.p.m.	More than 0.1 p.p.m.
4612	1773 (38.44%)	2210 (47.92%)	629 (13.64%)

In the 4612 samples analyzed in the 3 3/4 years, a background of DDT at low levels shows up in most samples, although 38.44% show no detectable residues. There is no established tolerance in milk and dairy products but an actionable level of 1 p.p.m. is used by Food and Drug. No agricultural food samples during the 3 3/4 years exceeded tolerances which for most food products were set at 7 p.p.m. Some of the samples involved investigations of suspected or known problem cases. Random checking confirms that DDT has not posed a problem to human health or in the main, to fish and wildlife, in Alberta.

The major concern of wildlife agencies is to reduce and stop mass contamination of the environment. Sampling of pheasants, partridge and other game birds, ducks and other water fowl, antelope and other game animals, plus various fish, has indicated that there is no general problem with DDT. However wildlife surveys show higher levels of DDT and its metabolites in birds of prey which may be an important factor in the decline of these species. There may be local hot spots such as northern lakes where DDT has been used in the past for mosquito and biting fly control in petrochemical development, defence establishments and similar activities. These should show up with increased monitoring in the future.

The other organochlorine insecticides such as aldrin, chlordane, dieldrin, endrin and heptachlor have also gradually been replaced with organophosphate and carbamate compounds. These newer compounds are shorter lasting, but generally less effective requiring higher dosages and repeat applications, are more expensive and usually more toxic to the handler and applicator. Thus many factors need to be considered in evaluating risks and benefits - if pesticides are to continue in use and competent authorities including FAO and WHO consider they must - then banning or undue restriction does not resolve the problem, unless suitable alternates are available. A reasonable time period must be allowed for phasing out - or the problem of disposal of the compound left in the supply line itself poses a problem as has become apparent where DDT was virtually banned.

The Alberta government generally supports the policy used in managing grasshopper insecticides. In 1948 chlordane was tested and replaced arsenic and sodium fluosilicate in poison baits. Since Canadian stocks were not available, the department of agriculture imported 90,000 lb. technical chlordane and formulated field sprays to replace poisonous arsenic baits. In 1950 aldrin spray replaced chlordane reducing dosage from 12 oz. to 2 oz. per acre and cost from 56¢ to 35¢ per acre. Further field tests resulted in dieldrin spray replacing aldrin at 1 oz. actual chemical costing 15¢ per acre. When residue problems showed up in the early 1960's dieldrin was phased out and replaced by malathion and dimethoate as shown in the table on Page 3 (year 1965) of the Appendix.

By a system of controls including the use of declaration forms signed by farmers purchasing grasshopper chemicals, a strong publicity and educational campaign, and close supervision by municipal and government staff, over one million acres of crop was sprayed in each year 1961-62-63, without any significant contamination problems occurring.

The Alberta government is considered to have one of the best systems in Canada for managing pesticides and other agricultural chemicals for the following reasons:

1) Most laboratories and other investigating agencies, except those of Health, are now located in the O.S. Longman Laboratory Building, Edmonton. This permits effective team-approach in diagnosis, identification, determination and other aspects of investigation and problem solving. Various investigations into pesticide residues have been documented in some 33 reports and publications (Appendix Pages 12 - 15).
2) Monitoring and residue analysis for pesticides commenced in 1961 and many problems have been resolved by follow-up investigation to eliminate contaminations and maintain high quality. This is a continuing program involving many provincial and federal agencies. A watching-brief is maintained and problems are resolved without fanfare or scare-tactics. During the last eight years, agricultural food produce was withheld from human consumption until insecticide residues were reduced to safe levels on nine dairy and three poultry farms.
3) Various coordinating and liaison committees have been in operation for years of background work in protecting the interests of health, fish and wildlife, forestry, parks and agriculture - often resolving conflicting interests.
4) Training programs for pesticide applicators and others using pesticides extensively have been established, by a correspondence course at the University of Alberta, and classroom courses at agricultural and vocational colleges, and junior colleges. About 90 one-day agricultural chemical schools have been held in the last five years to cover all parts of the province.
5) A licensing program under the department of health has been in operation since 1966. At present some 240 pesticide applicators, including municipal and government staff, are trained and licensed.
6) Legislation is being revised to cover present or potential problem areas, under the Public Health Act and others. A new Agricultural Chemicals Act was enacted by the 1969 Legislature to provide guide-lines and control in proper and safe use. The above Act will be proclaimed within the next few weeks, when regulations are completed to provide for better use, application, handling, transport, storage and disposal of pesticides.

Other important activities are provided in more detail in the Appendix under Pollution Abatement And Control (Pesticides) Pages 1 to 24. New problems will

arise even before we fully resolve the current ones. We have the proper organization, liaison, and spirit of cooperation and dedication to handle current and future problems in pesticides, and to protect man and the total environment. However it should be realized that there are numerous complexities involved and rapid solutions are neither possible nor prudent. Progress will depend on the sustained effort of all concerned.

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POLLUTION ABATEMENT AND CONTROL (PESTICIDES)

Alberta Department of Agriculture
– in cooperation with other Departments and Agencies

The following is a listing in brief, chronological order of activities in the management of pesticides for their effective and safe use:

1948 - Field tested and first used chlordane insecticide as safer, more effective replacement for arsenic and sodium fluosilicate used in baits for grasshopper control.

1949 - Cooperated with federal Departments of Agriculture and National Defence in "Control Of Grasshoppers Over A Large Area By Treatment With Chlordane Solution Sprayed From Aircraft" Suffield Report No. 147 July 24, 1950 to test efficacy and safety.

- Field tested aldrin to replace chlordane for grasshopper control - reduced rate from 12 to 2 oz. actual per acre - 90,000 lb. technical chlordane formulated by A.D.A. for use as first field spray to replace arsenic bait.

1950 - Aldrin supplied to replace chlordane in grasshopper control - reduced application rate 6 times and cost from 56¢ to 35¢ per acre.

1951 - Dieldrin field-tested - provided effective control at 1 oz. actual costing 15¢ per acre. Aldrin stocks were gradually used up and fully replaced by dieldrin in 1958.

- Coyote control in settled areas became the responsibility of the Alberta Department of Agriculture (A.D.A.) under the Agricultural Pests Act and Regulations. Cyanide guns, strychnine and 1080 poison were field-tested for efficacy and safety. Several hundred coyote control schools were held over the years to train department, municipal staff and farmer users. A safety program, including use of training certificates and poison release forms, operated during the 1953-57 rabies outbreak and is still effective today. Some poisons are supplied for prescribed use on private land but 1080 poison is handled by only trained department staff.

1952 - Field testing of various rat poisons for several years resulted in an effective formulation of Warfarin anti-coagulant bait to replace arsenic, strychnine and other toxic poisons. With some modification over the years, this Warfarin formulation is still being used effectively and safely today.

1955 - Approved canisters and gas masks first supplied to District Agriculturist offices, municipalities and grain companies to provide for safe fumigation of insect-infested grain.

1956 - Infestations of European corn borer exterminated at Medicine Hat and Brooks by destruction of all corn crop residues - no insecticide needed and province still free of this pest to date.

- Review of arsenic poisonings, background levels of arsenic, including searching for the element as a contaminant in agricultural chemicals.

1957 - Crop Production Board established with subcommittees in Soils & Fertilizers, Weed Control, and Pest Control to review research and advise A.D.A. in effective and safe use of agricultural chemicals and pesticides. The Board became the Alberta Agricultural Coordinating Committee in 1965 to coordinate all activities of A.D.A. with the advice of research agencies.

1958 - Completion of studies in the toxicological aspects of 24D, 245T.

1959 - Publication 139 "Chemical Control of Insect Pests" first issued, recommending effective but safe insecticides, emphasizing dangers of improper use, residue problems, wait periods to harvest or slaughter, hazards to humans, livestock, fish and wildlife - updated and revised annually since as "Control of Field Crop Insects", "Control of Livestock Insects", "Control of Garden Pests", etc.

- Forestburg Warble Test Project established in cooperation with Lethbridge Research Station, etc. Over a 3 year period about 20,000 total cattle were sprayed each fall on over 200 farms with recent systemic insecticides to test extermination of the warble fly on a large area basis and safety to humans, cattle and other life.

- Initial air pollution field studies involving;
  (1) The Fertilizer Industry (Medicine Hat)
  Oxides of Nitrogen, Fluorides.
  (2) Sulphur Extraction Plant (Pincher Creek)
  Hydrogen Sulphide, Sulphur Dioxide.

- Predator, Wildlife and Conservation Subcommittee was formed to deal with environmental quality and pollution problems - reported to Pest Control Advisory Committee.

1960 - A special publication "Grasshopper Control on Forage and Pasture" issued to deal with insecticide residues in milk and meat products. Aldrin and dieldrin were not to be used on feed crops but recommendations made for toxaphene, malathion and sevin.

- Granular insecticides field-tested for sweet clover weevil control to eliminate residue problems from dieldrin and heptachlor sprays - granular application only partially effective.

- Action initiated to survey for pesticide residues in food, hold agricultural chemical schools, and investigate the licensing of commercial pesticide applicators.

1961 - Monitoring for pesticide residues in milk and dairy products commenced by Dairy Laboratory with field investigations coordinated by Plant Industry Division staff.

- Malathion was tested for grasshopper control on forage and pasture to eliminate dieldrin residues - six insecticides field tested as safer alternatives. Malathion tested and recommended for control of sweet clover weevil.

1962 - Farmers were required to sign a declaration concerning the proper and safe use of dieldrin supplied by A.D.A. for grasshopper control. Use terminated at shot-blade stage of growth of cereals.

- Malathion supplied by A.D.A. for grasshopper control on pasture and forage. Four alternate insecticides field tested.

- Residue analyses of dairy and meat products from areas of extensive dieldrin use showed no significant difference from the rest of the province.

- First agricultural chemical dealer's school held - expanded to cover all districts over the next 5 years with about 90 one-day-training schools held for D.A.'s, agricultural fieldmen, dealers and farmers.

1963 - Food Residue Committee formed within A.D.A. to direct investigations, analysis and liaison with other agencies.

- Dimethoate proved effective in field tests and supplied by A.D.A. to replace malathion and dieldrin as an effective, less persistent insecticide for grasshopper control. Declaration form required upon farmer purchase of all grasshopper insecticides.

- Conducted insecticide use survey on several hundred farms using grasshopper insecticides - possible misuse less than 0.5%.

- Cooperation with Department of Health to establish regulations to license commercial pesticide applicators.

1964 - Cooperation with Department of Health in a 4-day Pesticide Training School for provincial and municipal staff.

- Mercury Poisoning in Swine.
  Studies conducted regarding the possible synergisms between hydrogen sulphide, sulphur dioxide and ozone.

- Concern expressed to urban and rural municipalities regarding pesticide spray programs with encouragement to use training courses and specialist's advice.

1965 - Cooperation with Department of Health in establishing a correspondence course on pesticide application at the University of Alberta.

- Dieldrin being phased out and replaced by dimethoate for grasshopper control - however infestations dropped off and it took several years to use up dieldrin stocks.

Volume in Pounds of Grasshopper Insecticide Used 1961-68

Pesticide	1961	1962	1963	1964	1965	1966	1967	1968
Tech. Dieldrin	63,690	63,750	40,000	10,040	1,060	390	700	--
Tech. Malathion	--	175,650	36,000	1,450	250	400	--	--
Tech. Dimethoate	--	--	52,200	5,500	540	690	2,064	3,404

1965 - Alberta Interdepartmental Committee on Pesticides (A.I.C.P.) established as an advisory, operational, and liaison inter-agency group, with representatives from provincial and federal health, fish and wildlife, and agriculture, to review all pesticide problems, and report to the Minister of Agriculture, and through his office to the Ministers of Health, and Lands and Forests.

- Background paper "Pesticide Use and Control in Alberta" prepared for the 1966 National Pollution Conference, as part of the combined submission by the Departments of Health, Lands & Forests, and Agriculture.

- All positive cases of pesticide residues over tolerance investigated to determine and eliminate source.

1966 - Warning poster "Treated Seed is Poisonous" developed in cooperation with Alberta Safety Council, etc. to promote safe handling at seed plants, farm bins, etc.

- Wireworm seed treatment project on storage and germination - completed 2 years work with Saskatoon Research Station (published 1967 Jour. Plant Science).

- Cooperation with Department of Health in establishing and operating training courses and licensing commercial pesticide applicators.

- Gophacide first field - tested as a safer replacement for strychnine in pocket gopher control and proven effective 1966-68. Burrow builder machines developed and promoted for large area control for efficacy and safer handling of poison baits.

- Several larvicides were field-tested to replace DDT in control of blackfly larvae in streams (NCPUA Research Report 1966) of northern Alberta, in cooperation with Alberta Fish and Wildlife and the University of Alberta.

1967 - Under the federal Potato Diversion Program, over 400 carloads of surplus potatoes from 107 farms were analyzed for insecticide residues, safe feeding rates established and supervised for diversion to starch manufacture and livestock feeding.

- Several less persistent alternates for aldrin were field-tested in cooperation with Lethbridge Research Station for control of root maggots in turnips, cabbage, radish and onions (NCPUA Research Reports 1966-67-68).

- Three years of extensive field testing of new phosphate rodenticide, Gophacide, as less toxic replacement for strychnine in control of pocket gophers, prairie gophers, mice, and other field rodents. (summary reports available).

- Cooperated with Food & Drug and other agencies in resolving problems in two poultry flocks placed under detention after feeding with treated seed. Considerable new information developed in decontamination of poultry from heptachlor insecticide and mercury fungicide (1967 & 68 A.D.A. Annual Reports; Dr. J. Howell report Can. Vet. Journal Vol. 10 No. 8 August, 1969).

1967 - Working Committee under A.I.C.P. developed first mosquito control bulletin for Alberta Pub. 673-2 "A Guide For The Control Of Mosquitoes In Alberta Municipalities, Parks, Camps And Resorts" based on DDT and Malathion.

- New Publication 607/400 "Pesticide Residues Can Be Serious" developed and distributed.

1968 - Reprocessed and re-canned 5900 gallons of five year old stocks of dimethoate at considerable effort and cost, to improve formulation and remove potential hazard of spillage due to old rusted containers.

- Deodorized malathion developed and recommended as replacement for toxic fumigants in controlling grain infesting insects and mites.

- Examined Pesticide Residues in eggs from Hens Exposed to Heptachlor. The clinical syndrome and pathology of heptachlor poisoning in geese was studied experimentally. Mercury Residues measured in Poultry.

- Ad hoc committee appointed to investigate effects on animals, plants and soil of chlorine gas escape from a Fort Saskatchewan plant (printed report available).

- Paper presentation "A Critical Look At The Agricultural Chemical Industry" Annual Meeting, Canadian Agric. Chemicals Ass'n., Winnipeg, Sept. 1968.

- Aquatic Plant Control Committee established with members from Fish & Wildlife Health, Agriculture, and Industry, to develop effective and safe procedures for controlling water weeds in recreational and irrigation waters.

1969 - Paper presentation "Agricultural Chemicals - New Hazards To Farm Safety" Twelfth Annual Western Farm Safety Conference, Banff, February 1969.

- Mosquito control bulletin revised to remove DDT from recommended use and to include malathion, abate and baytex, proven successful in field tests. Dursban field tested in City of Edmonton control program.

- Paper presentation "Pesticide Legislation And Control In Alberta" Agricultural Pesticide Society, Annual Convention A.I.C. Saskatoon, Aug. 1969.

- Investigation of mercury contamination in game birds. Hunting of pheasants and H. partridge banned. Cooperative effort of provincial and federal health, fish and wildlife, and agriculture, through the A.I.C.P.

- Agricultural Chemicals Act passed by the Legislature following two years work by an interdepartmental committee from Agriculture, Health and Lands & Forests. Regulations being drafted to establish programs of licensing of pesticide applicators, control of pesticide storage, transport, handling, disposal, etc.

- Meetings of the Western Canada Committees on Crop Pesticides & Livestock Pesticides, and the A.I.C.P. recommended that DDT and other organochlorine insecticides should be restricted to a few essential uses but a total ban was not necessary or desirable.

- Paper presentation "Pesticide Residues" to the Canadian Forage Crop Symposium May 1969.

Alberta Acreage Of Field Crops Treated

Herbicide (Commonly used)	1968	1969
2,4-D and MCPA	8,259,000	5,596,000
Avadex and Carbyne (For wild oat control)	576,000	668,000

Pounds Used in Western Canada

Herbicide (For hard to Kill weeds)	1968	1969
Dicamba) Bromoxynil) Dichlorprop)	197,000	255,211
TCA	918,000	640,000
Dalapon	185,000	154,000

1) Weed control publications are up-dated each year, and include precautions and warnings regarding proper herbicide and safe use.

2) The Canada Weed Committee at its 1969 annual meeting declared there was no indication of pollution problems in our water, soil or air due to herbicides.

Committees Active In Management Of Pesticides

Alberta Crop Production Board - est. 1957; became AACC 1965.
Pest Control and Weed Advisory Committees - est. 1957.
Western Committee on Livestock Pesticides - est. 1959.
Wildlife, Predator and Conservation Committee - est. 1959.
National Committee on Pesticide Use in Agriculture - est. 1961 (CCPUA 1969).
National Weed Control Conference - est. 1952 (CWC - 1969).
Western Committee on Crop Pesticides - est. 1962.
A.D.A. Food Residue Committee - est. 1962.
Alberta Interdepartmental Committee on Pesticides - est. 1965.
Aquatic Plant Control Committee - est. 1968.

February 2, 1970

Number of Samples Tested for Pesticide Residues from 1961 to 1969

	1961	1962	1963	1964	1965	1966	1967	1968	1969*
	All Samples Prior to Nov. 30/61	Dec. 1/61 to Nov. 30/62	Dec. 1/62 to Nov. 30/63	Dec. 1/63 to Nov. 30/64	Dec. 1/64 to Nov. 30/65	Dec. 1/65 to Nov. 30/66	Dec. 1/66 to Nov. 30/67	Dec. 1/67 to Nov. 30/68	Dec. 1/68 to Oct. 31/6
ry Products	87	147	260	263	352	726	178	813	846
s and Egg Products	-	-	-	57	98	80	251	138	127
ds and Forage	-	1	4	26	72	141	40	34	28
etables and Fruits	-	-	2	9	29	92	131	33	64
garine	-	-	-	-	-	7	-	5	15
mal Fat and Tissue	2	15	34	18	127	99	30	188	206
er	-	8	8	-	8	46	139	120	48
an Tissue	3	12	-	1	-	3	131	129	1
an Milk	-	-	-	-	-	25	45	19	-
dlife	-	-	-	12	1	95	88	87	189
ls	-	-	-	-	-	1	-	8	9
earch, Recovery Runs, llaborative Studies	-	-	-	-	89	69	362	61	51
cellaneous	-	1	5	25	5	15	10	30	45
ual Total	92	184	313	411	781	1399	1405	1665	1629

* Year 1969 covers only 11 months to October 31, 1969.

Grand Total: 7789

Source: Alberta Department of Agriculture, Dairy Branch Laboratory, 1969.

Question - - "How many humans were poisoned with agricultural chemicals?"

Table I. Pesticide* Poisonings and Resultant Deaths Classified by Year and Age Groups.

1964 - June 30, 1969

Age Groups	1964	1965	1966	1967	1968	To June 30, 1969	Totals
0 - 4	142	131	127	118	110	61	689
5 - 14	17	25	13**	10	17**	6**	88
15 - 24	4	6**	9	2**	2	3**	26
25 - 44	7	6**	8**	6**	8**	7**	42
Over 44	9**	17**	7**	3**	3**	3	42
Total Pesticide Poisonings	179	185	164	139	140	80	887
Total Pesticide Deaths***	1	4	5	3	4	4	21

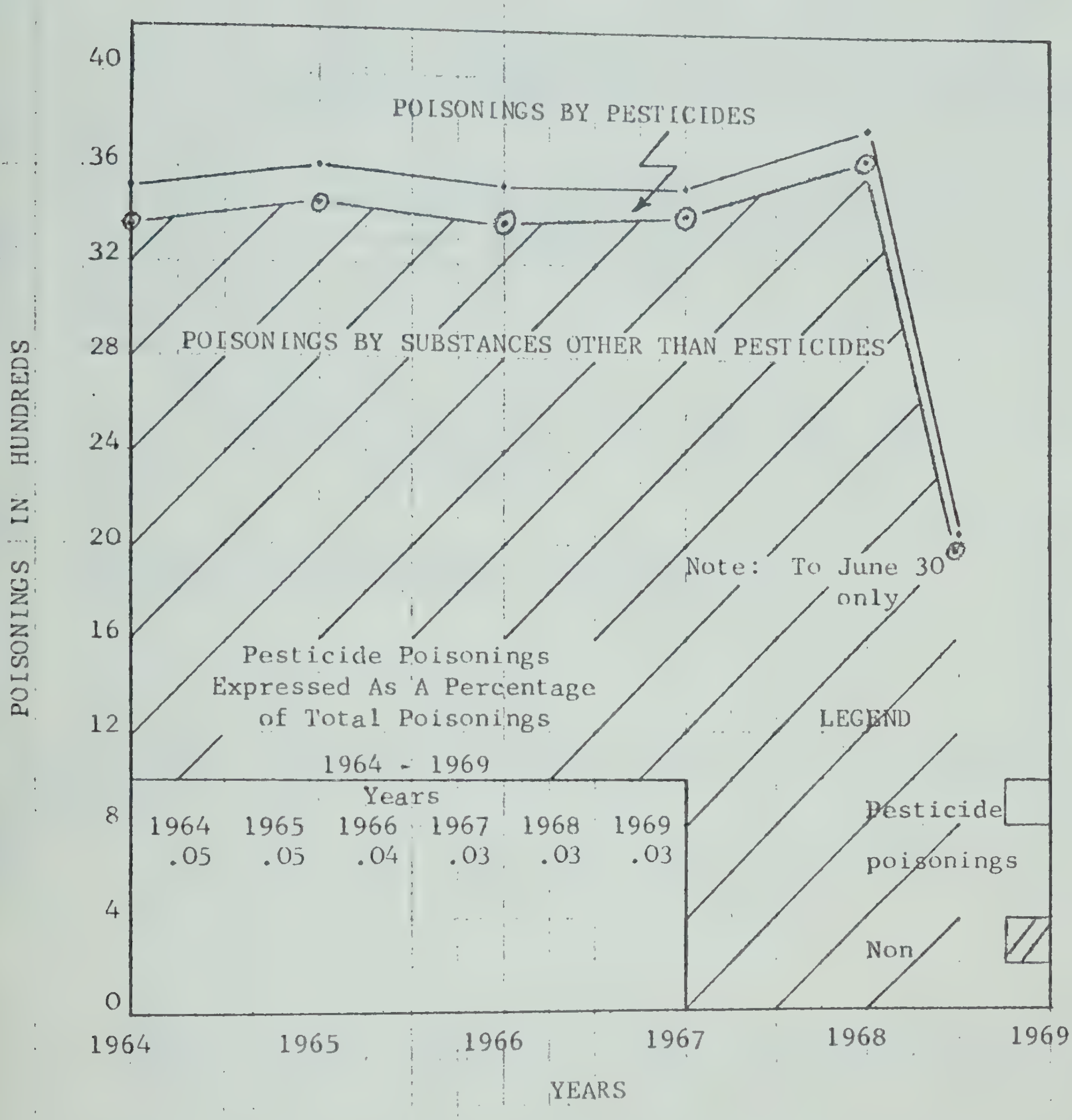
Source: Alberta Department of Health, Poison Control Services.

* Pesticides are defined by world health International Code E 865 as Pesticides, Fertilizers or Plant Foods. (See Item F in Appendix 2-a and Table II in Appendix 2-b).

** Signifies that a death occurred in this age grouping.

*** There is no information concerning the accidental or suicidal nature of the recorded death.

FIG. ONE - POISONINGS IN ALBERTA

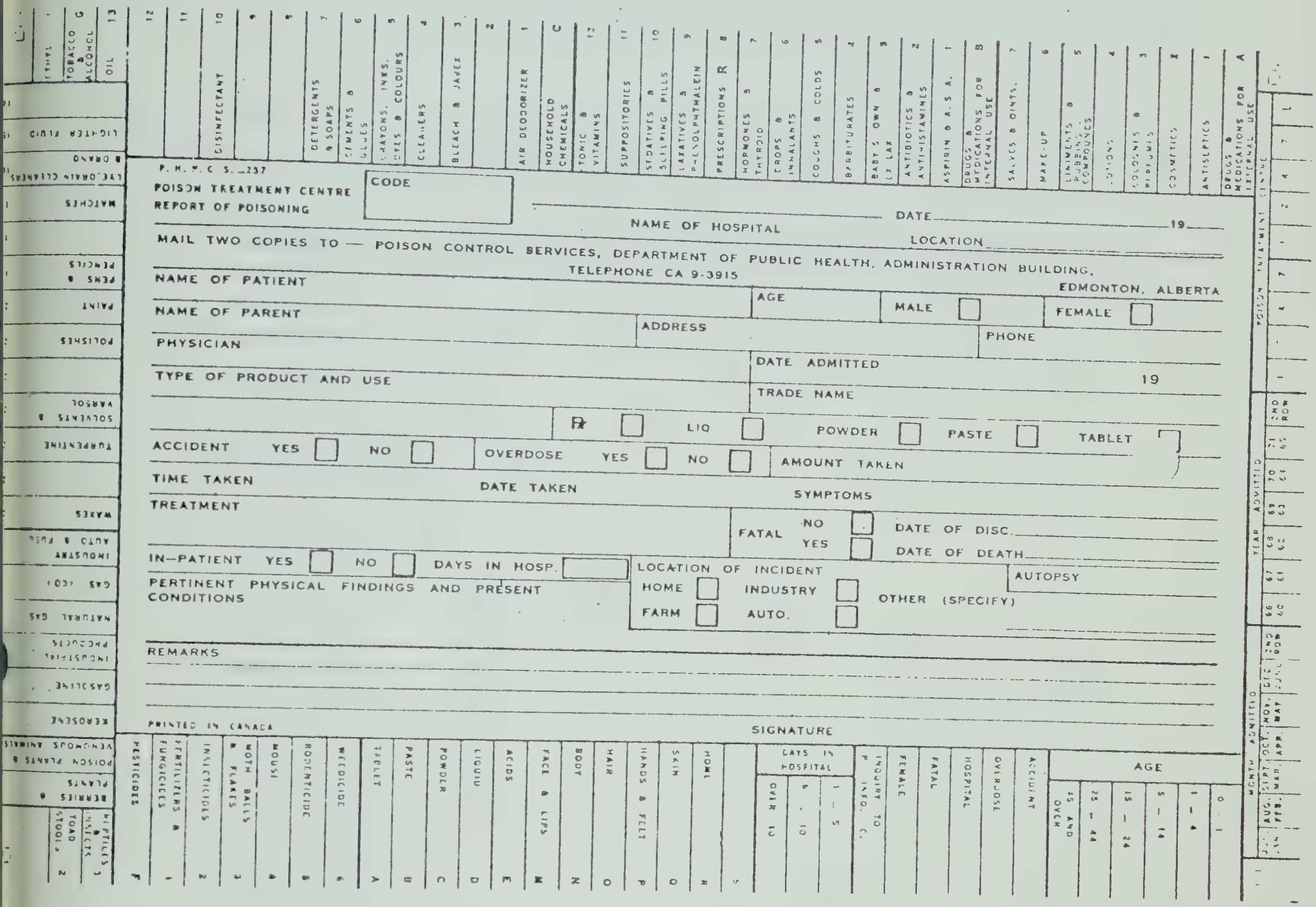


Pesticide Poisonings Expressed As A Percentage of Total Poisonings

1964 - 1969

Years					
1964	1965	1966	1967	1968	1969
.05	.05	.04	.03	.03	.03

DATA SOURCE - Alberta Department of Health,
Poison Control Services



TOBACCO & ALCOHOL G
OIL 13
12
11
DISINFECTANT 10
9
8
DETERGENTS & SOAPS 7
CEMENTS & GLUES 6
CRAYONS, INKS, DYES & COLOURS 5
CLEANERS 4
BLEACH & JAVEX 3
2
AIR DEODORIZER 1
HOUSEHOLD CHEMICALS C
TONIC & VITAMINS 12
SUPPOSITORIES 11
SEDATIVES & SLEEPING PILLS 10
LAXATIVES & PHENOLPHTHALEIN 9
PRESCRIPTIONS R 8
HORMONES & THYROID 7
DROPS & INHALANTS 6
COUGHS & COLDS 5
BARBITURATES 4
BABY'S OWN & EX LAX 3
ANTIBIOTICS & ANTIHISTAMINES 2
ASPIRIN & A. S. A. 1
DRUGS & MEDICATIONS FOR INTERNAL USE B
SALVES & OINTS. 7
MAKE-UP 6
LINIMENTS, RUBBING COMPOUNDS 5
LOTIONS 4
COLOGNES & PERFUMES 3
COSMETICS 2
ANTISEPTICS 1
DRUGS & MEDICATIONS FOR EXTERNAL USE A

LIGHTER FLUID
LYE, DRAIN CLEANERS & DRANO
MATCHES
PENS & PENCILS
PAINT
POLISHES
SOLVENTS & VARSOL
TURPENTINE
WAXES
INDUSTRY & AUTO FUEL
GAS (CO)
NATURAL GAS
INDUSTRIAL PRODUCTS
GASOLINE
KEROSENE
VENOMOUS ANIMALS
POISON PLANTS &
BERRIES & PLANTS
TOAD STOOLS 2
REPTILES & INSECTS 3

P. H. P. C. S. 237

POISON TREATMENT CENTRE
REPORT OF POISONING

CODE

NAME OF HOSPITAL
DATE ______ 19___
LOCATION ______

MAIL TWO COPIES TO — POISON CONTROL SERVICES, DEPARTMENT OF PUBLIC HEALTH, ADMINISTRATION BUILDING, EDMONTON, ALBERTA
TELEPHONE CA 9-3915

NAME OF PATIENT
AGE
MALE ☐
FEMALE ☐
NAME OF PARENT
ADDRESS
PHONE
PHYSICIAN
DATE ADMITTED 19
TYPE OF PRODUCT AND USE
TRADE NAME
℞ ☐ LIQ ☐ POWDER ☐ PASTE ☐ TABLET ☐
ACCIDENT YES ☐ NO ☐
OVERDOSE YES ☐ NO ☐
AMOUNT TAKEN
TIME TAKEN
DATE TAKEN
SYMPTOMS
TREATMENT
FATAL NO ☐ YES ☐
DATE OF DISC. ______
DATE OF DEATH ______
IN-PATIENT YES ☐ NO ☐
DAYS IN HOSP. ☐
LOCATION OF INCIDENT
HOME ☐ INDUSTRY ☐
FARM ☐ AUTO. ☐
OTHER (SPECIFY)
AUTOPSY
PERTINENT PHYSICAL FINDINGS AND PRESENT CONDITIONS
REMARKS

PRINTED IN CANADA

SIGNATURE

PESTICIDES F
FERTILIZERS & FUNGICIDES 1
INSECTICIDES 2
MOTH BALLS & FLAKES 3
MOUSE 4
RODENTICIDE 5
WEEDICIDE 6
TABLET A
PASTE B
POWDER C
LIQUID D
ACIDS E
FACE & LIPS M
BODY N
HAIR O
HANDS & FEET P
SKIN Q
HOME R
S
DAYS IN HOSPITAL
OVER 10
6 - 10
1 - 5
INQUIRY TO P. INFO. C.
FEMALE
FATAL
HOSPITAL
OVERDOSE
ACCIDENT
AGE
45 AND OVER
25 - 44
15 - 24
5 - 14
1 - 4
0 - 1

MONTH ADMITTED
JULY, JAN.
AUG., FEB.
SEPT., MAR.
OCT., APR.
NOV., MAY
DEC., JUNE

YEAR ADMITTED
60 66
61 67
62 68
63 69
64 70
65 71

POISON TREATMENT CENTRE

Source: Alberta Department of Health, Poison Control Services

The heading "pesticides" (F) is given to "weedicide", "rodenticide", "mouse", "moth balls and flakes", "insecticides" and "fertilizers and fungicides".

In the following table, recorded for the years 1966 to 1968, pesticides are sub-divided by type. This sub-division may help to illustrate the variety of materials contributing to death or illness from pesticide poisoning. It may also indirectly illustrate that many deaths and illnesses designated as pesticide poisonings occur in the home rather than during the course of agricultural employment.

Table II. Pesticide Poisonings and Resultant Deaths Classified by Age Groups and Substance. 1966 - 1968.

	Age Groups				
Substance	0-4 yrs.	5-14 yrs.	15-24 yrs.	25-44 yrs.	45 - Up yrs.
Fertilizers (Fertabs)	52	2	-	-	-
Naphthalene (Moth Balls,etc.)	97	4	1	1	
Seed Treatment (Mercury, etc.)	15	8	4	1	1
Chlorinated Hydrocarbons (Fly Spray)	22	4	1	4	3
Herbicides	29	1	2	3	3
Rodent Poison	82	8	2	4	4
Arsenicals	11	1	-	-	-
Insect Repellents	21	-	-	-	-
Copper Sulphate	4	2	-	-	1
Organo Phosphorus Compounds	2	-	-	1	-
Ferrous Sulphate	1	-	-	-	-
Lime & Alkalies	-	-	-	-	-
Miscellaneous	22	7	-	-	6
Totals	358*	37	10	14	18

Source: Alberta Department of Health, Industrial Health Services.

* Please note that there are small numerical discrepancies between the two reporting agencies. Consequently the data in Table I do not produce the same values for the years 1966 - 1968 as those shown on Table II.

Reports and/or Publications regarding Pesticide Residue Work, submitted by
Poultry Disease Section
Veterinary Services Division

1. Jonasson, O. J. et al, "Residues in the Tissue of Geese which had consumed Treated Grain", In Pesticide Research Report, National Committee on Pesticide Use in Agriculture, Ottawa, 1968, pp 296-297.

2. "Strychnine Poisoning in Canada Geese", Bulletin Wildlife Disease Association, Volume 5, Ames, Iowa, April, 1969, p. 119.

3. Howell, J., "Mercury Residues in Chicken Eggs and Tissues From A Flock Exposed to Methylmercury Dicyandiamide", In Canadian Veterinary Journal, Volume 10, No. 8, August, 1969, pp 212-213.

4. Howell, J., "Heptachlor Residues in Chickens" Internal Fi[illegible] Poultry Diseases Section, Veterinary Services Division, 1[illegible].

Reports and Publications regarding Pesticide Residue Work by the Dairy and Food Laboratory
Alberta Dept. of Agriculture

1. Preliminary Report on the Screening For Pesticides And Antibiotics In Milk And Milk Products As A Public Health Measure
   Public Health Research Grant
   Provincial Project 608-7-40
   Prepared by Dr. J. B. Linneboe, Dr. V. W. Kadis and G. Tourigny, Alberta Dept. of Agriculture, November 3, 1961.

2. Report No. 2, Screening For Pesticides And Antibiotics in Milk And Milk Products As A Public Health Measure
   Provincial Project 608-7-40
   Prepared by J. H. Brown, Alberta Public Health Dept., V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture, October 10, 1962.

3. Antibiotics and Insecticides in Milk by V. W. Kadis
   Presented at the Sanitary Inspectors in Service Training Course, Edmonton, May 29, 1962.

4. Report No. 3, Screening For Pesticides And Antibiotics in Milk And Milk Products As A Public Health Measure
   Provincial Project 608-7-40
   Prepared by J. H. Brown, Alberta Public Health Dept., V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture, October 15, 1963.

5. Antibiotics, Pesticides and Radioactive Fallout in Milk by V. W. Kadis –
Presented at the Alberta Dairymen's Association Spring Conference, April 1962, Calgary and April 25 in Fairview.

6. Pesticides and Antibiotics by V. W. Kadis
Presented at the Can. Inst. of Food Technology, Edmonton Section Meeting, April 15, 1963.

7. Some Observations Regarding Certain Rapid Procedures For Detection of Pesticides in Foods
By V. W. Kadis, O. J. Jonasson and J. H. Brown, Alberta Dept. of Agriculture and Public Health
Presented at the Annual Conference of the Canadian Institute of Food Technology, May 13-15, 1963, Montreal.

8. Safe Food Production - The Residue Problem by V. W. Kadis
Presented at the Alberta Dept. of Agriculture Conference, Edmonton, October 9, 1963.

9. Screening For Pesticide Residues In Dairy Products and Animal Fat
By V. W. Kadis, O. J. Jonasson and J. H. Brown, Alberta Dept. of Agriculture and Dept. of Public Health
Pest. Research Report 255, 1963.

10. Final Report on The Screening For Pesticides and Antibiotics In Milk And Milk Products As A Public Health Measure
Provincial Project 608-7-40
Prepared by J. H. Brown, V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture and Dept. of Public Health, August 31, 1964.

11. Pesticide Residues In Dairy Products, Animal Tissues and Honey
By V. W. Kadis, O. J. Jonasson and J. H. Brown, Alberta Dept. of Agriculture and Dept. of Public Health
Pest. Research Report 270, 1964.

12. Chlorinated Insecticide Residues in Fresh Eggs
By V. W. Kadis, O. J. Jonasson, W. E. Breitkreitz and J. H. Brown, Alberta Dept. of Agriculture and Dept. of Public Health
Pest. Research Report 272, 1964.

13. Preliminary Report On The Screening For Pesticides In Dairy, Meat, Egg And Other Food Products As A Public Health Measure
Public Health Research Grant
Provincial Project 608-7-72
Prepared by V. W. Kadis, O. J. Jonasson, W. E. Breitkreitz and J. H. Brown, October 15, 1964.

14. Insecticide Residues in Fresh Vegetables
By V. W. Kadis, O. J. Jonasson and W. E. Breitkreitz, Alberta Dept. of Agriculture
Pesticide Research Report 211, 1965.

15. Report No. 2, Screening For Pesticides In Dairy, Meat, Egg And Other Food Products As A Public Health Measure
Provincial Project 608-7-72
Prepared by J. H. Brown, V. W. Kadis, W. E. Breitkreitz and P. A. Hurry, Alberta Dept. of Public Health and Dept. of Agriculture, October 8, 1965.

16. Chlorinated Insecticides in Animal Blood
By V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture
Pesticide Research Report 215, 1965.

17. Insecticide Residues In Fresh And Frozen Eggs
By V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture
Pesticide Research Report 217, 1965.

18. The Detection and Persistence of Chlorinated Insecticides in Human and Animal Blood
By V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture
Canadian Journal of Public Health 56: 433, 1965.

19. Reports of the Alberta Dairymen's Association Sub- mittee on Contaminating Substances in Milk and Dairy Products
Presented by V. W. Kadis (Alberta Dept. of Agriculture) at the Alberta Dairymen's Association Annual Meetings in 1967, 1968 and 1969.

20. The Persistence of Chlorinated Insecticides In the Milk of Dairy Cattle
By V. W. Kadis, O. J. Jonasson and W. E. Breitkreitz, Alberta Dept. of Agriculture
Pesticide Research Report 163, 1966.

21. Determination of Organochlorine Pesticide Residues in Human Tissues
By V. W. Kadis, O. J. Jonasson and W. E. Breitkreitz, Alberta Dept. of Agriculture
Can. J. Public Health 59: 357, 1968.

22. Residues in the Tissues of Geese Which Had Consumed Treated Grain
By O. J. Jonasson, V. W. Kadis and J. Howell, Alberta Dept. of Agriculture,
Pesticide Research Report 297, 1968.

23. Significance of Residues in Feeds As Possible Contaminants of Poultry Meats and Eggs
By V. W. Kadis, Alberta Dept. of Agriculture
Report of the NCPUA Working Party on Pest. Residues in Milk and Animal Products, 197, 1968.

24. Measurement of Chlorinated Pesticide Residues in Human Tissues
By O. J. Jonasson and V. W. Kadis, Alberta Dept. of Agriculture
Report of the 2nd Pest. Residue Analysis Seminar, 27, February 1967.

25. Investigation of the Elution Characteristics of Florisil Containing 3% Added Water
    By O. J. Jonasson, Alberta Dept. of Agriculture
    Report of the 3rd Pest. Residue Analysis Seminar, Regina, p. 63, April 1968.

26. Preparation, Extraction and Clean-up of Samples for Residue Analysis
    By V. W. Kadis, Department of Agriculture
    Report of the First Pest. Residue Analysis Seminar, Vancouver, 24, February 1966.

27. Application of Microcoulometric Methods in Pesticide Residue Analysis
    By O. J. Jonasson, Dept. of Agriculture
    Report of the First Pest. Residue Analysis Seminar, Vancouver, 33, February 1966.

28. Preliminary Studies on a Method of Dieldrin Analysis in Insects
    By O. J. Jonasson, Alberta Dept. of Agriculture and D. M. Rosenberg, University of Alberta
    Presented at the Annual Meeting of the Entomological Society of Alberta, Lethbridge, October 24-25, 1969.

29. Organochlorine Residues in Alberta Population
    By V. W. Kadis and O. J. Jonasson, Alberta Dept. of Agriculture
    To be published.

Acceptable Claims for DDT Formulations for Registration Under the Pest Control Products Act

Formulations:

Du	dust
EC	emulsifiable concentrate
Sn	solution
WP	wettable powder

AGRICULTURAL CROPS AND LIVESTOCK

Host or Location	Pest or Use	Dosage Rate and Formulations	Directions for Use
apples	tarnished plant bug	16 oz. in 100 gallons of water WP EC	Begin applications when bugs are noted. Repeat at 10-14 day intervals or as needed. Do not apply within 42 days of harvest.
strawberries	strawberry leaf roller, spittle bugs, flea beetles, strawberry weevil, plant bugs (including tarnished plant bug)	32 oz. per acre Du WP EC	Treat when buds first appear. Repeat as necessary for control. Do not use after fruit begins to form.
raspberries, blackberries	flea beetles, plant bugs, spittle bugs	32 oz. per acre Du WP EC	Treat foliage as necessary for control. Avoid use after fruit begins to form.
red beets	subterranean cutworms, flea beetles	24 oz. per acre WP	Apply to soil around plants to control cutworms. Treat seedlings to control flea beetles. Do not apply within 30 days of harvest.
celery	subterranean cutworms, flea beetles, plant bugs	32 oz. per acre Du WP EC	Treat soil around plants to control cutworms. Apply to foliage to control beetles and bugs. Repeat as needed for control. Do not treat after bunching begins.
radishes	flea beetles	24 oz. per acre WP	Apply to seedlings at emergency only.

...2/

CANADA DEPARTMENT OF AGRICULTURE
PRODUCTION AND MARKETING BRANCH
PLANT PRODUCTS DIVISION

DATE Ottawa, Ontario
November 6, 1969

NUMBER
T-26

Pesticide

TRADE MEMORANDUM

Re: DDT Uses Acceptable for Registration Under the Pest Control Products Act

After consultation among various federal and provincial government agencies, a revised use pattern for DDT has been prepared. Use of DDT has been retained only for those applications where there is no suitable alternative control measure. The greatly reduced range of uses for DDT will help to prevent future residue problems and to alleviate environmental pollution. As with all registered pesticides, DDT is subject to constant review in the light of current scientific research findings.

The labelling of presently registered products containing DDT must be revised to agree with the accepted uses set out in the attached summary. Any other claims for the use of DDT, including those which may have been accepted in the past, will not be accepted for registration, unless supported by new evidence with respect to usefulness and safety.

Draft labelling which complies with the revised acceptable uses for DDT must accompany applications for 1970 registration. Appropriate precautionary statements and first aid information must be included on the revised labelling.

Stocks of DDT products held by registrants at the manufacturing level, as of November 14, 1969, must be relabelled in accordance with the attached summary before offering for sale in 1970.

Disposal of unsold stocks of products containing DDT must be done in a safe manner. If stocks remain on hand and distribution through trade channels is not possible, the material must be safely eliminated such as by burial at garbage disposal areas.

JAS/pm

Replaces Memorandum T-26 dated June 11, 1969.

Host or Location	Pest or Use	Dosage Rate and Formulations	Directions for Use
sugar beets	flea beetles	16 oz. per acre Du WP EC	Apply to foliage in seedling stage for control of infestations.
turnips (rutabagas)	flea beetles, red turnip beetle	32 oz. per acre Du WP EC	Treat foliage as necessary to control infestations. Do not apply within 30 days of harvest.
rape, mustard	flea beetles, red turnip beetle	10 oz. per acre Du WP EC	For use on seedling stage only. Do not apply after four leaf stage.
tobacco	subterranean cutworms	16 oz. per acre EC	Apply to rye crop when six inches high in April before tobacco is planted.
beef cattle	horn flies, black flies, mosquitoes, gnats	0.5% solution WP EC	Spray solution on cattle at rate of 2-4 quarts per animal. Repeat as necessary for protection of cattle. Do not treat within 90 days of slaughter. Do not use on dairy cattle at any time.
		5% oil solution Sn EC	Apply to backrubbers. Keep applicators well supplied.
horses	winter ticks	10% dust Du	Apply treatment to animals to control infestations. Repeat if necessary.
foxes	fleas, lice, ticks	10% dust Du	Dust onto coat and repeat as needed for control of pests.

...3/

HOUSEHOLD AND INDUSTRIAL USE

The following uses are acceptable for registration only if the labelling specifies use by pest control operators only and the product is not offered through trade channels servicing the general public.

Host or Location	Pest or Use	Dosage Rate and Formulations	Directions for Use
homes, hotels, motels, and other dwellings; non-food industrial plants and storage areas	bedbugs, stored product insects	5% solution WP EC 10% dust Du	Use as a residual on surfaces where insects occur. Do not use on surfaces that may contact food.
	bats	50% dust Du	Apply to surfaces where pests are found. Repeat as necessary.
woolen fabrics, clothing, rugs, carpets, blankets	clothes moths, carpet beetles	1-5% solution Sn EC 10% dust Du	Spray on rugs and carpets to obtain 0.5% deposit by weight. For fabrics, blankets and garments, treat to obtain 0.3% deposit by weight. Apply dust lightly to fabrics and garments before storage.

FOREST INSECT AND BITING FLY CONTROL

The following uses are acceptable for registration only on the basis of confirmation that the specific application has been concurred in by the Minister of Agriculture upon recommendation from a federal interdepartmental committee. Where applicable there will be consultation with provincial interdepartmental committees.

Host or Location	Pest or Use	Dosage Rate and Formulations	Directions for Use
forest areas, plantations, parks	forest insect pests	2-16 oz. per acre Sn EC	For application to foliage to control infestations.
non-crop vegetation and other outdoor areas	adult mosquitoes, black flies, sand flies	2-4 oz. per acre Sn EC	For ground application to reduce nuisance due to adult biting flies.

PRODUCTION AND MARKETING BRANCH

PLANT PRODUCTS DIVISION

January 21, 1970

T-18

Pesticide

TRADE MEMORANDUM

Re: Supplemental Information on DDT Registration and Disposal Guidelines

Details on acceptable uses and labelling of DDT formulations and their registration status for 1970 were contained in a memorandum T-26, dated November 6, 1969. This memorandum provides supplemental information on registration and disposal guidelines.

General: The registration status of DDT has been markedly changed for 1970 as compared with 1969. Registrations for the coming season for DDT products that are represented for general use are being limited for use only on one or more of twelve crops and one or more of three types of animals as follows:

The fruit crops: apples, strawberries, raspberries and blackberries;
the root crops: red beets, sugar beets, turnips, radishes and celery, and
the field crops: tobacco, rapeseed and mustard;
the animals are: beef cattle, horses and foxes.

This reduction from a former list of over 60 uses reflects the continuing program of reducing the amount of DDT entering the environment while recognizing those uses for which there is no practical alternative.

The former major uses of DDT in forestry, biting fly control and agriculture in Canada have over the past few years been all but replaced with the use of other insecticides. It was these discontinued uses that accounted for the bulk of DDT release into our environment.

Reregistration: DDT products may be reregistered for 1970 provided the new labelling is in full accord with the revised use pattern and labelling requirements for 1970.

The sale by the registrant of any stocks of such products labelled other than in accordance with the terms of reregistration, will be a violation of the Pest Control Products Act.

Disposal: Much concern has been expressed about the disposal or use of carry-over stocks of DDT products. Because of the risk of concentrated contamination of water and the atmosphere, these products should be used up in accordance with label directions wherever practical. DDT should not be used, however, for those purposes that are now forbidden by provincial regulations. If there are no acceptable uses for the product, or there is no longer a need or a desire to use them, disposal should be made in accordance with the local community's program for disposal of DDT. In the absence of such a program, it is recommended that disposal be by burying the DDT product in its original container, sealed to be leak-proof, at least 18 inches deep in soil that does not flood or drain into nearby water. Disposal by burning is only recommended in burners known to destroy the DDT safely.

Label Precautions: The label precautions on new labels are to include directions on disposal, not only of unused product but also of empty containers. Specific wording is not being recommended at this time, rather registrants' proposals will be considered in the light of the foregoing paragraph on "Disposal" when labels are submitted for review.

CROP PROTECTION & PEST CONTROL
ALBERTA DEPARTMENT OF AGRICULTURE
EDMONTON, ALBERTA.

CHJ/pm

For your information
and possible use

NEWS RELEASE

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ALBERTA DEPARTMENT OF AGRICULTURE

MINISTER URGES CAUTION IN USE AND DISPOSAL OF DDT

Indiscriminate dumping of DDT insecticide down household drains and sewers could create greater pollution problems than those which governments are trying to resolve, warns Alberta's agriculture minister H. A. Ruste. Referring to the recent decision of the federal government to sharply limit the use of DDT in 1970, Mr. Ruste said present stocks of DDT can be used in accordance with instructions and warnings printed on the container. However, after present supplies have been used up the number of food crops on which the insecticide may be used will be reduced from the present 62 to 12.

In addition to placing a limit on the number of crops on which DDT may be used the federal government has said that the chemical may not be used on any large scale program to control such insects as mosquitoes and biting flies in urban communities, parks, recreation areas, forests and so on.

Where householders wish to dispose of any small amounts of DDT rather than use it this should be done by normal garbage pick-up for burial at garbage disposal sites. Farmers without access to such disposal are advised to bury the chemical and the container at least 18 inches deep in a location away from streams, water courses, dugouts, wells and other water supplies.

Mr. Ruste said Alberta's position on DDT use and restrictions will follow very closely the federal government's policy. However, in accordance with recommendations made by both the Alberta Interdepartmental Committee on Pesticides and the Western Canada Committees on Crop and Livestock Pesticides a complete ban will not be ordered at this time. For a number of years, said the minister, the Alberta department of agriculture has recommended the use of less persistent insecticides, and will continue to do so.

Leaflet 745

The University of Alberta

DEPARTMENT OF ENTOMOLOGY

INTERIM RECOMMENDATIONS - OCTOBER 1969

Insecticides for Use Around the Home and Garden

by W. G. Evans

Some of the most common insect pests found around the home, such as leaf miners, pear-slugs, tent caterpillars, cabbage butterflies, bedbugs, silverfish, booklice, fleas, mosquitoes, flour beetles, larder beetles, and carpet beetles have been successfully controlled for many years either by DDT or one of its related compounds such as chlordane, lindane or methoxychlor. These materials belong to a group of insecticidal compounds called "chlorinated hydrocarbons" which have been extensively used since 1946 throughout the world to control major agricultural and industrial insect pests as well as insects of medical importance.

Unfortunately, some of these chlorinated hydrocarbons, such as DDT, are extremely stable and persist in the environment after they are used to control insects. Evidence is now rapidly accumulating concerning the adverse effects of these materials on wildlife. When DDT is applied to the land the pests may be controlled but due to its stability it breaks down very slowly. Generally, it is carried with run-off water into streams and rivers and eventually to the ocean so that it is now a world-wide pollutant. DDT is rapidly absorbed by microscopic animals and plants which in turn are eaten by animals such as fish, then larger fish, then birds in the food chain. Enormous residues of DDT have been found to accumulate in this way in the tissues of various predators, particularly birds. These high residues have resulted in a decrease in egg hatchability and in chick survival.

Even though the chlorinated hydrocarbon insecticides are very effective materials for pest control there is an increasing conviction among scientists that these pesticides constitute a threat to wildlife on a world-wide basis and that they should be replaced by less persistent materials.

Already several countries such as Sweden, Denmark, and the Netherlands have imposed severe restrictions or altered recommendations on the use of chlorinated hydrocarbon insecticides and several of the important agricultural states in the United States such as Michigan, Arizona and New York, as well as some provinces in Canada, have similar legislation.

In view of these developments the Department of Entomology has decided to revise all of its Insect Information Leaflets which have recommended the use of chlorinated hydrocarbon insecticides, substituting less stable materials for these.

In the meantime, homeowners should avoid using DDT, chlordane, lindane, methoxychlor, dieldrin, aldrin, endrin and heptachlor or preparations containing any of these materials. If problems do arise concerning insect control before the revised leaflets are ready for distribution entomologists from the University or from the Provincial or Federal Departments of Agriculture should be consulted. If this is not feasible any of the commercial household preparations based on pyrethrum (active ingredient: pyrethrins) are recommended for use against any of the common household insects.

(To be mailed with all copies of leaflet nos. 290, 360, 740, 833a, 833, 842, 893, 895, 920, 921, 1023, 1050, 1055)

WEEKLY LETTER

Lethbridge Research Station

W. L. No. 1870
For release December 3, 1969

THE FUTURE OF DDT AND OTHER PERSISTENT INSECTICIDES

Dr. N. D. Holmes, Head, Entomology Section

DDT will be recommended only for two insect pests of crops in the prairies in 1970. By 1971, if entomologists at the Lethbridge Research Station are successful, one insect, the flea beetle, will no longer require DDT for its control. The other one, the red turnip beetle, is a relatively minor pest.

At Lethbridge we are continuing to search for a suitable replacement for endrin as a control for cutworms. At the same time scientists at the Saskatoon Research Station are working to find replacements for heptachlor, aldrin, and lindane as controls for wireworms.

These were some of the results and discussions of a meeting of the Western Committee on Crop Pesticides that met in October at Lethbridge. The advantage of such a committee is that it combines the wide range of scientific, technical, and extension interests needed to deal with the complex problem of insecticide use. It also can provide the factual information needed by the public to make intelligent decisions.

Public awareness of pollution dangers is needed and should be fostered. But, in the process of educating the public to these dangers, the hazards of pesticides can be oversold.

DDT is an example of overselling. In the recent controversy on mercury-contamination of game birds several Alberta newspapers immediately blamed DDT. The public is convinced that DDT is a great danger to human health although present evidence does not warrant such a conclusion. Comparisons have been drawn between the effects of DDT and the atomic bomb, although DDT has saved, and is saving, millions of people from death by malaria. DDT is said to be likely to reduce the world supply of oxygen by killing oceanic plankton, although the evidence for this is not convincing.

Nevertheless DDT has been shown to harm certain birds and fish, and common sense dictates against the needless release of persistnet insecticides such as this into the environment. It has been easy to restrict the use of DDT in the prairies because less-persistent insecticides are available that will readily control most outbreaks of insect pests of crops.

We cannot expect that restricting or even banning DDT or other organochlorine insecticides will solve all our problems. Indeed, new problems that cannot be foreseen are very likely to arise.

A recent example of unexpected problems is pollution by detergents. No one foresaw that detergents would cover rivers with masses of foam. The change to biodegradable detergents to avoid foaming created a worse problem in the rapid increase of algae resulting from the phosphate released from the new detergents.

Most technological advances, including those in the field of insecticides, bring undesirable side effects that can be descovered only after the advance is widely used. The newer insecticides will produce unexpected side effects despite the most careful advance study. Nevertheless we must continue to rely on them because for most insects they still provide the only practical means of insect control.

The only solution is to continue extensive research into alternative methods of insect control and, in the meantime, watch carefully for adverse effects of the new insecticides in cooperation with experts in health and wildlife. Thus, we can hope to continue to control insect pests and to prevent widespread pollution of our environment.